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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/081,046	02/20/2002	Hardayal Singh Gill	SJ09-2001-0142/11758	2452
33224	7590	10/06/2003		
INTERNATIONAL BUSINESS MACHINES CORPORATION 5600 COTTLE ROAD, DEPT. L2PA/0142 INTELLECTUAL PROPERTY LAW SAN JOSE, CA 95193-0001				
			EXAMINER BEACHAM, CHRISTOPHER R	
			ART UNIT 2653	PAPER NUMBER

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/081,046

**Applicant(s)**

GILL, HARDAYAL SINGH

**Examiner**

Christopher R. Beacham

**Art Unit**

2653

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-12, 14-16 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 6, 13 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A (1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the examiner has cited the references on form PTO-892, they have not been considered.

### ***Drawings***

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure Number 66. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

The disclosure is objected to because of the following informalities:

- On page 6, lines 26-32, are unclear and confusing.
- On page 7, line 29, "72" should be -62--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1-4, 7-12, 14, 15, 18 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Hasegawa et al. (hereinafter Hasegawa) (US 6,496,338).

- Regarding claims 1, 7 and 18, Hasegawa shows a magnetoresistance sensor structure comprising:

- a magnetoresistance sensor having a sensor surface plane and comprising of a free layer 44;

- a lower antiferromagnetic layer 42, and

- an upper antiferromagnetic layer 46 overlying at least a portion of the free layer 44; and

- an upper ferromagnetic layer 47 overlying and contacting at least a portion of the upper antiferromagnetic layer 46 on a contact face lying parallel to the sensor surface plane, so that the upper antiferromagnetic layer 46 lies between the upper ferromagnetic layer 47 and the free layer 44 (Fig. 3).



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- Regarding claims 2 and 8-10, Hasegawa teaches the upper antiferromagnetic layer is PtMn (col. 7, lines 48-51) and the upper ferromagnetic layer is CoFe (col.11, lines 28-33).
- Regarding claims 3, 11 and 19, Hasegawa discloses that the magnetoresistive sensor is a giant magnetoresistance sensor (col. 1, lines 20-26).
- Regarding claims 4 and 12, Hasegawa shows an upper antiferromagnetic layer and an upper ferromagnetic layer overlie a first portion of the free layer that is less than all of the free layer, and further including a cap layer overlying a second portion of the free layer (Fig. 5).
- Regarding claims 14 and 15, Hasegawa shows an upper antiferromagnetic layer and an upper ferromagnetic layer overlie a first portion of the free layer that is less than all of the free layer, and further including a lead layer 48 overlying the upper ferromagnetic layer 47 (Fig. 3) including a cap layer overlying a second portion of the free layer (Fig. 5).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. Claims 5, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al. (hereinafter Hasegawa) (US 6,496,338). as applied to claims 1, 7 and 18 above, and further in view of Gill (US 6,052,263).

- Regarding claims 5, 16 and 20, Hasegawa discloses all the features except the magnetoresistance sensor being a tunnel magnetoresistance sensor.

Gill '263 discloses that another type of magnetic device is a magnetic tunnel junction (MTJ) sensor (col. 2, lines 8-11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce the magnetoresistance sensor of Hasegawa as a magnetic tunnel junction (MTJ) sensor as taught by Gill '263.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to produce the magnetoresistance sensor of Hasegawa as a magnetic tunnel junction (MTJ) sensor as taught by Gill '263 so that the thermal stability of the sensor can be improved by using the high coercivity magnetic materials (Gill; col. 3, lines 36-38).

#### ***Allowable Subject Matter***

3. Claims 6, 13 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- a. Lin et al. (US 5,436,778) is cited to show a magnetoresistive sensor having antiferromagnetic exchange bias.
- b. Fontana, Jr., et al. (US 5,729,410) is cited to show a magnetic tunnel junction device with longitudinal biasing.
- c. Gill (US 6,040,961) is cited to show a current pinned, current resettable soft AP pinned spin valve sensor.
- d. Lin et al. (US 6,185,078) is cited to show a spin valve read head with antiferromagnetic oxide film as longitudinal bias layers and portions of the first read gap.
- e. Huai et al. (US 6,222,707 B1) is cited to show a bottom or dual spin valve having a seed layer that results in an improved antiferromagnetic layer.
- f. Fuke et al. (US 6,313,973) is cited to show a laminated magnetorestrictive element of an exchange coupling film, an antiferromagnetic film and a magnetic disk drive using the same.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Beacham whose telephone number is (703) 605-4256. The examiner can normally be reached on M-F, 8: 00 am-5: 30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.



Christopher R. Beacham  
Patent Examiner  
Art Unit 2653  
October 1, 2003



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